

Summer 2024

Plant Pages

Department of Agronomy and Plant Genetics
University of Minnesota



50+ years of the Hayes Phillips Award

ABOUT US

We discover knowledge and breed crops to sustainably feed people in Minnesota and around the world.

We value:

- Excellence in teaching, in basic and translational research, and in outreach and extension
- Contributions that impact not only producers and farms but society at large—human health, communities, economy, energy, and the environment
- Working in teams of people with complementary skills and expertise
- Rich perspectives brought by a diverse group of students, faculty, and staff

CONNECT WITH US

www.agronomy.umn.edu

Telephone: 612-625-7773

X: @UMN_AgroPlant

Instagram: @UMN_agronomyplantgenetics

Facebook: U of M Agronomy & Plant Genetics

SUPPORT US

Private gifts help us maintain and enrich our programs and truly make a difference to our students, faculty, and staff.



agronomy.cfans.umn.edu/give

WELCOME



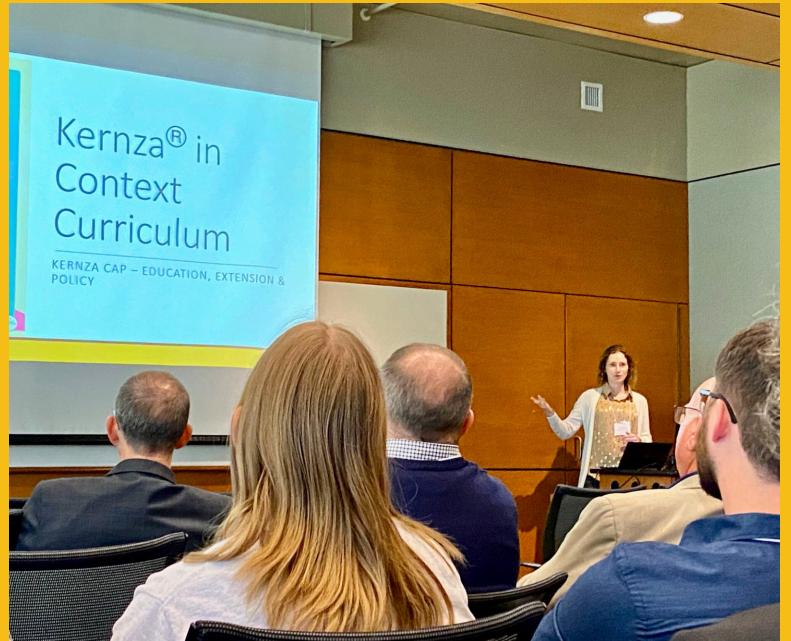
Gary Muehlbauer, APG Department Head

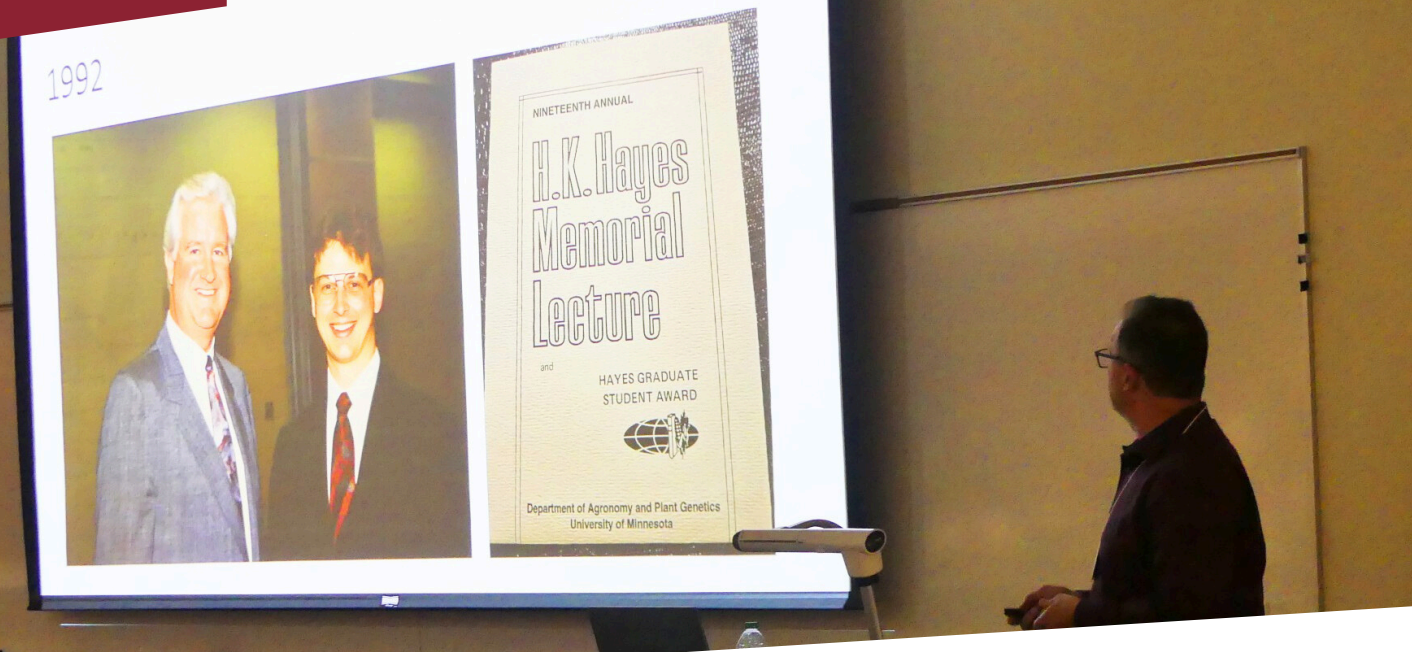
Welcome to the Summer 2024 issue of *Plant Pages*. It's been a busy semester for our department, and we ended it with a bang: a two-day celebration of the Hayes Phillips Award, which marked its 51st anniversary this year. We decided to make this year a big deal as we wanted to invite all 50 previous winners and celebrate them, as well as our 2024 awardee, Hannah Stoll. Twenty of our alums returned "home," as our associate dean Milena Saqui-Salces described it when she opened the awards ceremony on May 17.

You can read about it and see some highlights on the following pages. We hope you enjoy the new design of *Plant Pages* and share our pride in the department as you catch up on the news from APG.

On the cover: Past and present awardees gather for the annual Hayes Phillips Award ceremony on May 17.

At right, past Hayes and Hayes Phillips awardees Jianming Yu (2003), Michael Burns (2023), and Todd Krone (1993) talk with graduate student Jason Hickman during the speed mentoring activity during the Hayes Phillips Awards program. Below right, Hannah Stoll presents her research work, and below left, APG department head Gary Muehlbauer and Roberto Tuberosa, the 2024 Distinguished Alumni-Academic Award winner.





APG celebrates 50+ years of the Hayes Phillips Award

Twenty former awardees joined a two-day celebration of the Hayes Phillips Award at the annual awards program in St. Paul on May 16 and 17. This year's program honored the 50 past awardees, 2024 recipient Hannah Stoll, and the recipients of APG's 2024 Distinguished Alumni Awards, Roberto Tuberosa and Tabare Abadie. A special seminar and tribute to Ron Phillips, who died last summer, kicked off the program, which included a "speed mentoring" gathering for graduate students to meet with previous Hayes and Hayes Phillips Award recipients and recognition of other members of the department who received awards during the last academic year.

Abadie, who was unable to attend the event, is a Distinguished Research Laureate at Corteva Agriscience and a Ph.D. (1994) graduate from the University of Minnesota. Tuberosa is a professor in the Department of Agriculture and Food Sciences at the University of Bologna in Italy. He received his Ph.D. at the U in 1997.

Shawn Kaepler, a University of Wisconsin-Madison faculty member who received his Ph.D. in Plant Genetics and Breeding from the University of Minnesota, was the 1992 Hayes awardee and the featured lecturer at the event.

The Hayes Phillips Award began as the Hayes Award in 1974 and is now named after two distinguished faculty members in the department: H. K. Hayes, a faculty member from 1915 to 1952, and Phillips, a faculty member from 1968 to 2010. Each year, the award is given to an APG graduate student who has excelled in academics, research, teaching, leadership, and service.

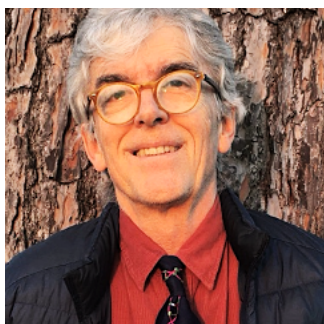
Above, Shawn Kaepler displays a photo taken in 1992 of himself with his Ph.D. advisor, Ron Phillips.

About the awardees



2024 Hayes Phillips Award

HANNAH STOLL will complete her Ph.D. in Applied Plant Sciences this year. She received her B.S. in Crop Sciences: Plant Biotechnology and Molecular Biology at the University of Illinois at Urbana-Champaign. Her thesis work at the University of Minnesota is focused on understanding the genetic architecture of key domestication traits in Kernza and determining the genetic gain per breeding cycle. Stoll's work at the U has included developing curricula centered around plant breeding and genetics. She has published classroom lessons that allow high school and undergraduate educators to teach basic biological concepts in the context of the development of new, sustainable cropping systems. Stoll—who developed a love for biology and genetics in high school—says she's passionate about education and hopes to be educating in some capacity in her future career.



Departmental Distinguished Alumni: Academic

ROBERTO TUBEROSA is a professor in the Department of Agricultural and Food Sciences at the University of Bologna. He received his B.S. from the University of Bologna and an M.S. (1985) and Ph.D. (1997) from the University of Minnesota under the guidance of Ronald Phillips. For the past three decades, he has managed research projects to develop cereal crops more resilient to climate change. His major research interest is the genetic dissection of the adaptive response of cereals to drought. Tuberosa is currently chair of the Focus Group on Cereals of the AgriFood Cluster of the Regione Emilia-Romagna, Italy, a fellow of the Crop Science Society of America, and represents Europe on the Board of the International Crop Science Society.



Departmental Distinguished Alumni: Industry

TABARE ABADIE is a Distinguished Research Laureate at Corteva Agriscience. Abadie received his B.S. in Agronomy at the Universidad de la Republica, Uruguay, in 1982, and his M.S. (1992) and Ph.D. (1994) at the University of Minnesota. Over a 40-year career, Abadie's extensive expertise in crop science includes plant breeding and quantitative genetics as well as technological change in large organizations, career development, education, and mentoring. Abadie is the developer and co-coordinator of the Plant Sciences Symposia Series, an international network of student-driven organized and hosted scientific events. The series began with the first Plant Sciences Symposium held at the University of Minnesota in 2008.

Hayes and Hayes Phillips Awardees 1974 to 2024

1974 William E. Kuhn

1975 Sheldon E. Blank

1976 Donn Cummings

1977 Steve R. Simmons

1978 Donald R. Viands

1979 Thomas J. McCoy

1980 James E. Miller

1981 Charlotte V. Eberlein

1982 Steve A. Thompson

1983 Josephine Heindl Coterman

1984 Oran B. Hesterman

1985 Debra Metzger Lee

1986 Patrick M. Hayes

1987 Virginia M. Peschke

1988 Beth M. Nelson (Schreiber)

1989 Peggy Egli

1990 Lori Marshall

1991 Brent W. Delzer

1992 Shawn M. Kaeppler

1993 Todd L. Krone

1994 Sandra C. Milach

1995 Philip M. Schwab

1996 Blair Waldron

1997 Jonathan Shaver

1998 Michael Olsen

1999 Joann Mudge

2000 Cristine Handel

2001 Lee DeHaan

2002 Juan Diaz

2003 Jianming Yu

2004 Lynn Litterer

2005 Martin Arbelbide

2006 Jennifer Jacobs

2007 Xiuling Zhang

2008 Haiyan Jia

2009 Robenson Lorenzana

2010 Toi J. Tsilo

2011 Jon Massman

2012 Emily Combs

2013 Michael Kantar

2014 Ana Poets (Gonzales)

2016 James Eckberg

2016 Prabin Bajgain

2017 Jared Goplen

2018 Jeffrey Neyhart

2019 Kayla Altendorf

2020 Austen Dobbels

2021 John Hill Price

2022 Rafael Della Coletta

2023 Michael Burns

2024 Hannah Stoll

(Those in bold attended the event.)

Highlights from the Hayes Phillips program



Hannah Stoll talks with Steve Simmons (Hayes, 1977) and Jon Massman (Hayes, 2011) during the speed mentoring session.



Donn Cummings (Hayes, 1976) talks with graduate students at the Thursday night reception.



Judy Phillips, spouse of Ron Phillips, and Kay Tuberosa, spouse of Roberto Tuberosa, at the awards ceremony



Milena Saqui-Salces, CFANS interim associate dean for research and graduate programs, opens the awards ceremony.

SHOUT OUT!

Hats off to Kevin Smith, who led the team who organized this wonderful event: Candy Hirsch, Craig Sheaffer, Jason Hickman, Bob Stupar, and Elisabeth Vose.



Distinguished Alumni Award recipient Roberto Tuberosa and Virginia Peschke (Hayes, 1987) with a student during the speed mentoring session.



Mjay Espina, finalist for the 2024 Hayes Phillips Award, with her advisors Bob Stupar and Aaron Lorenz.



Past awardees Toi J. Tsilo (2010) and Haiyan Jia (2008) with graduate student Lucas Roberts during the speed mentoring session.



Jim Anderson with some of his advisees, all of whom were Hayes or Hayes Phillips Award recipients. From left, Prabin Bajgain (2016), Toi J. Tsilo (2010), Hannah Stoll (2024), Anderson, and Xiuling Zhang (2007).



Let's talk about soybeans

Meet three APG faculty members who are working to bring the world new and improved soybeans.

By Kristal Leebrick

Soybeans are the number one agricultural export in the United States, and in Minnesota, nearly 8 million acres and more than 25,000 farmers are dedicated to growing the legume, more than half of which is exported out of the country.

At the University of Minnesota, Agronomy and Plant Genetics professors Bob Stupar, Aaron Lorenz, and Seth Naeve are doing critical work in the breeding, growth, and marketing of soybean varieties that fit consumer needs.

Stupar's soybean research focuses on molecular genetics and genomics of the species. Lorenz's work focuses on mapping the genes underlying complex traits relevant to soybean production and developing varieties. Naeve describes his work as "soybean management": working on yield and seed quality enhancement and expansion of the international market of soybeans and soybean products.

Continued on page 9

Above, Bob Stupar investigates a long-internode mutant plant.



At left, Aaron Lorenz (center) during soybean Field Day 2023, and at right, Lorenz crossing plants in the field.

"You can draw a line through these programs," Naeve says. "Bob and Aaron are working on traits that are important to soybeans, to make them more valuable to end users, and I'm helping market those traits to international buyers. I do work on soybean quality by identifying traits in our U.S. soybeans that are valuable for end users."

Right now, those valuable traits are ones that produce "a harvestable yield of oil," Stupar says. Not long ago, the bulk of the work of Stupar and Lorenz was developing varieties that had more protein. "But the market is changing," Naeve says. "The world's changing, and now there's interest in renewable diesel and sustainable aviation fuel, and so there's an increased demand for soybean oil."

"When I first started here it was protein, protein, protein," Lorenz said, "and then it was just like overnight, it's oil, oil, oil. We're working on a lot of aspects of oil."

"We are working with a crop that has two valuable components," Naeve says, "protein and oil. Protein goes to animals and the oil goes to biofuels and salad dressing and things like that

But over time, little shifts in these things make one more valuable than the other, and now it's really pushing these guys to make more oil."

It's not all oil, Stupar says. There's also a market for a more digestible product for animals: "We are looking at some of the traits that are involved in that. We have a sort of biotech and breeding approach converging on this project, so it's an interesting experience."

"Our job is to discover the genes and determine the inheritance of soybean quality and then create the tools to create novel soybean qualities that could be grown," Lorenz says, "and if there's enough value attached to that novel quality, you would eventually have the value pull itself through the market."

In the end, it's "our job is to help the farmers produce a crop that somebody wants to purchase," Naeve says.

"There's a lot of competition with South America, so we need to produce a crop that

Continued on page 10

somebody wants to buy, because it has value to them. We need to support the production of a volume and quality of crop to support the demands of the world."

Some of the most valuable seeds coming out of the labs in Borlaug Hall and Hayes Hall may be the graduating students.

"Half of our job is creating the people," Stupar says, "the educational skills and training that the private sector is going to need. The other half is to try to do breakthroughs on the academic side that can then translate into what those companies will also use."

Where it all began

Both Lorenz and Seth Naeve grew up on farms where soybeans were grown.

Lorenz was raised in Worthington, Minnesota, where his father still farms. He learned firsthand how useful new crop varieties are for improving yield and providing resistance to

various pests and other stresses, he says. Lorenz attended graduate school at the University of Wisconsin-Madison and was on the faculty at the University of Nebraska-Lincoln for several years before joining the APG faculty in 2015.

Naeve grew up on a farm in Iowa and attended Iowa State University in Ames with a plan to do something completely different than the rest of his family—and he did when he obtained a botany degree. But when he sought a professor to support him in graduate school there, "the only guy who had money was working on soybeans, and so I ended up with him, Dick Shibles.

"My family has grown soybeans forever," he laughs. "I thought I'd get away from the farm and soybeans, but here I am." Naeve joined the APG faculty in 1998.

Continued on page 11



Bob Stupar,
Aaron Lorenz,
and Seth
Naeve at Field
Day 2023.

Stupar hails from suburban Milwaukee. As an undergraduate at the University of Minnesota, he studied biology and became interested in plant breeding thanks to APG Professor Don Rasmussen, who suggested that Stupar's interests fit with plant breeding and genetics. "He encouraged me to look into the field and started giving me suggestions of people I might work with. I didn't have a direction at that point, and I thought I'd explore that," Stupar says.

Stupar received his Ph.D. at the University of Wisconsin–Madison, where he worked on potato genetics and breeding. He came to UMN as a postdoc and worked on corn. "I never worked on legumes or soybeans until I became a faculty member," he said. He credits Don Rasmussen and Ron Phillips, who connected him "to the people who made careers out of this, and it gave me the opportunity to see that you could do good things with it." Stupar joined the faculty at UMN in 2008.

Center promotes collaboration

The University of Minnesota [Soybean Research Center](#) was established in 2020 to bring together researchers across departments to collaborate on projects that improve soybeans for Minnesota growers and industries across the supply chain.

Lorenz and Naeve are the co-leads of the center, and Stupar is one of the researchers.

"We have a ton of expertise that we can tap into here," says Stupar, and the center provides a way for those experts to work together and find common connections. There is also an external piece, he says, "and that is promoting what we do." That includes an annual field day and symposium in late summer, lightning talks, and networking events.

One of the reasons there are so many people working on soybeans at the University of Minnesota is the soybean checkoff system, Naeve says. "There is funding available to do

research on soybeans—significant funding from local, regional, and national levels."

The soybean checkoff is a federally mandated program that requires soybean farmers to contribute 0.5 percent of the net market price for each bushel of soybeans sold to the first purchaser. The checkoff was created as part of the 1990 Farm Bill and became effective in 1991. The United Soybean Board governs the checkoff fund, and the money is divided equally on the state and national level. The Minnesota state portion is governed by the Minnesota Soybean Research and Promotion Council. Funds go toward research and marketing. The checkoff "has really built the soybean enterprise in the upper Midwest," Stupar says.

"It creates a public soybean research group for the public good of the soybean," Lorenz says. "All of us are just one small cog in that overall infrastructure, but if all that funding went away and we all went away, then I think the farmers would notice, especially in the long term."

"And we are especially important to do the work that's overlooked by industry or doesn't provide a short-term return on investment," Naeve says.

Research and educating farmers on how to take care of their crops are financial risks for private industry. "There's no return on investment for them," Naeve says. "We all kind of fit into the niches in the public sector to support parts of this enterprise that the companies would not fill."

The work of the Soybean Research Center brings efficiency in having researchers working together and promoting their work. "The funding agencies like that," Naeve says. "We need them to know that we work together."

"And we need to effectively communicate what we are doing," Lorenz says.

HEIDI F. KAEPLER

Associate Professor, University of Wisconsin-Madison

Heidi Kaepler is an associate professor in Plant and Agroecosystem Sciences at the University of Wisconsin-Madison. Kaepler earned her Ph.D. in Plant Breeding and Genetics here in 1990 in the Department of Agronomy and Genetics, working with her advisor, Donald Rasmusson, on barley genetics research. After completing her Ph.D., Kaepler worked as a postdoctoral research associate with David A. Somers and focused on cereal monocot tissue culture and transformation research at a time when the first successful monocot transformation systems were being reported. Kaepler then became a research associate with the USDA-ARS at the University of Nebraska-Lincoln, conducting studies on sorghum tissue culture and transformation.

In 1996, Kaepler and her husband, Shawn Kaepler, joined the faculty in the Department of Agronomy at the University of Wisconsin-Madison. Her research program focus throughout her career at UW has been on deciphering genetic mechanisms underlying somatic embryogenesis, plant tissue culture and transformation responses, and development and optimization of cereal monocot (and later dicot) genome engineering and editing systems. She also led the UW small grains breeding program during her early years there.

Kaepler is currently the faculty lead for Plant Genome Engineering/Editing Technologies Research and Development at the Wisconsin Crop Innovation Center at UW. The center was established in 2017 and has



Heidi Kaepler

Continued on page 13

become a leading public plant transformation and editing research and service facility in both the United States and worldwide, working with more 20 plant species to date.

While growing up and working on her family's large potato and small grains farm in far northern Maine, Kaeppler developed her interest in finding ways to help farmers with the many challenges of crop production. During her time as an undergraduate student, she worked at the University of Maine Agricultural Research Station and became interested in genetic approaches toward crop improvement.

While at UMN, Kaeppler married Shawn Kaeppler, who was also a grad student, and they had two of their children ("F1s!") while there. When she was pregnant with their first child and doing field work on the barley research program, Kaeppler learned that Dr. Rasmusson's wife had seen her in the field and scolded him for "making" Kaeppler do hot, taxing fieldwork. Rasmusson then asked Kaeppler if she was okay working out in the field, and she replied that it was no problem at all, especially coming from a hard-working farm background. Rasmusson said he wasn't sure what to ask Kaeppler regarding fieldwork since she was his first pregnant graduate student. "That's okay," she replied. "This is my first time working as a pregnant graduate student!"

They both had a big laugh about it.

During the time that the Kaepplers were at UMN, there was a large cohort of graduate students and postdocs within the Agronomy and Genetics Department. Both Kaepplers enjoyed many social events together with their peers, including several fishing and camping trips, hunting excursions, social get-togethers at students' and postdocs' homes or nearby parks, a summer softball league, and playing noontime basketball at the gym near Borlaug Hall. Lifetime friendships and professional connections were made among the group.

Kaeppler and her husband went on to have four children (two UMN Gophers, one University of Nebraska-Lincoln Corn Husker, and one UW Badger) and raised them on their small farm south of Madison, putting them to work in their UW field research plots. Kaeppler's graduate students and postdocs (who she calls her "academic" children) have gone on to successful plant genetics and biotechnology-related careers in industry, academia, government, and NGOs and are contributing to next-generation research and education in the fields of plant breeding and genetics, molecular genetics, and biotechnology.



UNIVERSITY OF MINNESOTA

Driven to Discover[®]

WILLIAM ROONEY

Regents Professor, Texas A&M University

William Rooney is a Regents Professor and the Borlaug-Bayer Chair in Crop Improvement in the Department of Soil and Crop Sciences at Texas A&M University. He earned his B.S. (1987) and M.S. (1989) degrees in Agronomy and Plant Breeding at Texas A&M University. He received his Ph.D. in Plant Breeding and Genetics from the University of Minnesota in 1992. After a brief stint as an assistant professor (alfalfa breeding) at Kansas State University (1993-1995), he returned to Texas A&M in 1995 as an assistant professor.

Rooney has led a sorghum-improvement and breeding program at Texas with the goal of enhancing the productivity and profitability of grain, forage, and bioenergy sorghums and their production systems. The sorghum breeding program is used as a mechanism to develop and release sorghum germplasm to meet this goal.

His research emphasizes the genetic inheritance of disease resistance, grain quality, and agronomic productivity and adaptability wherein graduate student training is completed. In addition to his research in Texas and the United States, his program has conducted research and supported sorghum-breeding programs in Asia, Africa, and Central and South America.

Rooney grew up in College Station-Bryan, home of Texas A&M. His father was a faculty member there for 48 years and had a research and teaching program in grain quality (corn,



Bill Rooney

Continued on page 15

sorghum, and wheat). The family lived east of town on 150 acres, where they still have a small cattle operation. His parents were from northwestern Kansas, where both families operated wheat, sorghum, and cattle farms. Rooney says he spent much of his summers in Kansas working on his grandparents' farms.

As an undergraduate, Rooney initially majored in animal science, "but I quickly realized that was not for me," he says. "At that time, I was working for the sorghum breeding program (the program that I have run now for 30 years) and the work really appealed to me, so much so that I changed to an agronomy major. While I tried other disciplines within agronomy during my undergraduate years, none of them was as interesting as plant breeding."

During his time in Minnesota, Rooney worked in the oat program under the advisement of Ron Phillips, Howard Rines, and Deon Stuthman. "My research, which is antiquated compared to technology of today, focused on the breeding and characterization of crown rust resistance and the identification of RFLP markers linked to these resistance genes," he

says. "My time in the oat program definitely diversified my plant-breeding skill set and focused my interest in applied plant breeding."

Rooney and his wife, Megan, both grew up in Texas, so moving to Minnesota allowed them to experience a very different environment and educational setting, he says. "We learned about winter and really enjoyed our time in St. Paul and the surrounding areas. But most important, it was the relationships with my peer graduate students that are the most memorable. Many of these relationships have been maintained to this day, and it is not uncommon to meet classmates throughout the industry."

Rooney says he enjoys teaching and research and the impact that it has had on his life. "But there is much more to life than just work," he says. "I am blessed with a wonderful family. Megan and I have eight grandchildren (all within a three-hour drive) and it is a real pleasure for us to be a regular part of their lives."

"My time in the oat program definitely diversified my plant-breeding skill set and focused my interest in applied plant breeding."

DONN VELLEKSON

Helping farmers make the best use of their resources

What is your role here in APG?

I am a research scientist in Agronomy and Plant Genetics. My current role in the department is production management and breeding of a variety of crops, primarily in far northern Minnesota, developing best-management strategies for seed production of perennial ryegrass, canola, fescue, rye, Kernza, and other crops. I also have a focus on plant breeding and development of perennial ryegrass and hard fescue varieties.

Where did you receive your education and what was it that steered you into this field?

I graduated from the University of Minnesota Crookston in 1975 with a crop science degree. I was on the crops team at Crookston and have always had an interest in crop growth and development. While on one of our judging trips to Chicago and Kansas City, I met the advisor of the U of M St. Paul crops team, Laddie Elling. Dr. Elling knew my advisor at Crookston, Chuck Habstritt, very well.

In the spring of 1975, Laddie contacted Chuck to advise him of a position he had on his field research program in northern Minnesota that was based out of St. Paul. Chuck recommended me for the job, and I have worked in this department in much the same capacity since May 1975.

How has research changed over the years?

When I first arrived in 1975, most of the work I was involved with was seed production of Kentucky bluegrass and timothy. Everything was done by hand. Mechanization involved the workhorse on the farm, a two-wheel, walk-behind Bolens Huskie tractor that was used to pull a wooden row plot marker for planting, a 3-foot Gandy fertilizer spreader, and other small plot



Donn Vellekson presenting research at the canola field day in Roseau last summer.

attachments. Our "big" equipment was a 140 John Deere garden tractor used to pull a two-row Planet Jr. seeder, a rototiller, packer, harrow, and sickle mower among other items. For primary tillage, we were at the mercy of local farmers.

Today, much of our field equipment has been upgraded and we have equipment to do most field operations ourselves.

Crop focus has also changed. Because of market changes, very little Kentucky bluegrass or timothy are being grown in the area. Perennial ryegrass is now the primary seed crop and is a major part of our research. Canola acres are increasing in the area, and I manage the Minnesota canola production center. We also work on a number of other cash and cover crops with future potential.

When I first began in 1975, the flagship calculator I had at that time was a Canon Canola L1630 that had recently been purchased, costing about \$2,000, as I recall. [It was] capable of doing some statistical calculation previously done all by hand.

Continued on page 17

It was a big step up, according to Dr. Elling, and I was instructed to take good care of it. I was also told to be sure it was locked up in my desk when not in use! Much more sophistication followed a few years later, of course, but I still have this calculator on my desk.

Has the industry changed?

The grass and legume seed industry in the area is still intact. There has been some consolidation, however, and the number of crops that seed conditioners will accept to clean and sell has been reduced.

Has climate change affected your work?

Temperatures and total precipitation in northern Minnesota have increased more than in other areas of the state. The winters have gotten warmer but more extreme. This has created problems in maintaining a reliable winter snow cover for sensitive overwinter crops. Cover crop planting after harvest also has gotten more feasible because of the


longer growing season with a later killing frost on average in the northern Minnesota.

What are you working on right now that you find most interesting?

Working on many perennial crop species is interesting because of their unpredictable nature. Observing effects of imposed treatments outside of normal production practice can have many unexpected results.

Do you have anything that you are especially proud of in your career?

Helping farmers make the best use of resources to be more profitable and become more aware and better stewards of the environment. I received an honorary premier seedsman award from the Minnesota Crop Improvement Association for exemplary service in the seed industry. I also received the outstanding service award from the Minnesota Canola Council for contributions to the canola industry.



Interested in supporting current students as a mentor or volunteering in other ways? Visit cfans.umn.edu/alumni for more information.

MJAY ESPINA

Tell us about your work here at the University of Minnesota: How long have you been here and what is the focus of your research? Who are your advisors?

I have been at the U since 2017. I joined Aaron Lorenz's lab as a technician working on backcrossing high oleic traits in Minnesota soybean lines. I started my Ph.D. program in fall 2019 with Drs. Lorenz and Bob Stupar. My research focuses on understanding the genetic and physiological mechanisms underlying an abiotic stress in soybean, iron deficiency chlorosis (IDC).

Any special work or achievements that you are particularly proud of?

I consider being selected as one of the National Association of Plant Breeders Borlaug Scholars as one of my most significant achievements. It's an honor to be nationally recognized as one of the future leaders in the field of plant breeding. Another thing I take pride in is contributing to the development of Minnesota soybean lines that have been licensed or released as varieties. Knowing that some of those lines we developed will be planted in farmers' fields one day is incredibly rewarding.

Where did you attend school before coming to the U of M?

I did my undergrad at Visayas State University in the Philippines. I came to the United States in 2014 to work on my master's degree at Tennessee State University in Nashville.

Where did you grow up?

I grew up in the Philippines, in a small island province called Biliran. I was there until I finished high school.



Mjay Espina

What influenced your current educational path?

After completing my undergrad, I worked as an extension agent, teaching farmers in farmer field school. During this time, I conducted several technology demos on new rice technologies. Witnessing farmers' appreciation for these advancements fueled the desire to pursue research in plant science, as I recognized the tangible impact of applied research to farmers.

When you're not immersed in your work at the U, what do you like to do?

I enjoy spending time with my family. We often watch hockey games, play tennis, and explore the outdoors.

If you had not pursued your current educational and career path, what would you be doing?

If I had not pursued a career in science, I would love to be a pastry chef.

FIONA TODD

Fiona Todd's passion for plant science and sustainable agriculture began during her sophomore year of high school when she started volunteering at a community garden in her hometown in southeastern Michigan. The Covid pandemic lockdown had just begun, and "I was looking for something to fill up my time that was tangible and real, instead of digital," she says.

Working in the garden allowed her "to engage in a form of science that felt really meaningful to me while everything was virtual and abstract," she says. That experience led her to the University of Minnesota "specifically for the sustainable agriculture program because of how heavy of a plant science emphasis it has."

Todd will be a senior in CFANS this fall and is majoring in Sustainable Agriculture and Food Systems.

This summer, Todd is working on plant phenotyping in an internship with seed company WinField United at its Innovation Center in River Falls, Wisconsin. The project will pertain to physiological impacts of various stressors.

Last semester, Todd had worked in the USDA ARS Plant Science Research Unit as an undergraduate research technician, and this fall she will work in Peter Morrell's evolutionary genetics and plant evolution lab.

Outside of school and work, she serves as the president of the Gopher Crops and Soils Club,



Fiona Todd

the secretary of Beta of Clovia Sorority, and a volunteer with various organizations related to the plant sciences.

Following graduation next spring, she hopes to attend graduate school to pursue research in crop and plant physiology. "The processes that plants undergo to develop certain structures is endlessly fascinating to me," she says, "and I believe research in this area has the potential to revolutionize our understanding of the natural world."

Outside of school, work, and extracurriculars, Todd enjoys spending time with her pet tortoise, Ada, listening to history podcasts, and trying new foods.

APG HIGHLIGHTS



Marc Albertsen

Lifetime Achievement Award

Marc Albertsen (PhD '80, Plant Breeding) was awarded the CFANS Lifetime Achievement Award for a remarkable career spanning more than four decades in plant genetics and agriculture, culminating in his retirement as a Distinguished Laureate and Lead at Corteva. His numerous prestigious awards and recognitions, including induction into the Pioneer Inventor Hall of Fame and receipt of the DuPont Lavoisier Medal, reflect his outstanding contributions to the field and commitment to addressing humanitarian needs through agriculture.



Rex Bernardo with University President Prose Ivy G. Yepe, left, and his father, Dr. Fernando A. Bernardo, former president of the university, right.

Outstanding ViSCAN Award

Faculty member Rex Bernardo was honored by his undergraduate alma mater, the Visayas State University in the Philippines, which was having a month-long Centennial Anniversary celebration that culminated in an award ceremony for outstanding alumni on April 27.

Bernardo was one of 65 alumni honored at the event. The university's department of Plant Breeding and Genetics invited him to give a mentorship seminar earlier that week to students and faculty. He gave a two-part talk: *Advice to My Younger Self* and *Plant Breeding in 100 Years*.



Hueg-Harrison Fellowship

Inés Rebollo received the CFANS Hueg-Harrison Fellowship for the 2024-25 academic year. The fellowship recognizes graduate students who exemplify the student-mentor relationship. Rebollo's advisor is Rex Bernardo. Fellows receive a full stipend and tuition for the academic year.



Hats off to Max Fraser, spring 2024 graduate

Congratulations to Max Fraser, who received his Ph.D. this spring.



C. Jerry Nelson follows Lucas Roberts, Jake Kundert, and Joan Barreto Ortiz.

C. Jerry Nelson International Fellowship

Four recipients of the C. Jerry Nelson International Fellowship gave presentations on their international agriculture experiences at a luncheon held in April.

Joan Barreto Ortiz, who received his M.S. from the turfgrass science program in 2022 (advisor: Nancy Ehlke), received the fellowship in 2022 and spent six weeks in Veracruz, Mexico, working with the International Maize and Wheat Improvement Center (CIMMYT). Ortiz's internship goal was to gain experience in crop modeling.

Jake Kundert, a Ph.D. candidate in Soil, Water, and Climate (advisors, Jake Jungers and Jessica Gutknecht) and 2023 recipient of the award, spent two weeks in Xalapa, Veracruz, Mexico, working at the

Instituto de Ecologia (INECOL) researching soil processes in an area that was undergoing reforestation.

Lucas Roberts, a Ph.D. candidate in the Applied Plant Sciences (APS) program (advisor, Aaron Lorenz) and 2022 recipient, worked at the Agricultural Research Institute (INIA Chile) near Santiago, Chile, for three weeks researching virus pressure on beans.

Carlos Sanchez, an student in APS (advisor, Seth Naeve) and 2022 recipient, presented via video and described his experience at INIA Chile, where he researched soybean development.

Alexandra Griffin, a Ph.D. student in APS (advisor, Jake Jungers) was also a 2022 Nelson Fellow.

The fellowship was established by Dr. C. Jerry Nelson to support full-time graduate students in the Departments of Agronomy and Plant Genetics or Plant Pathology at the U to gain international experience in their research field. Nelson was a professor at the University of Missouri where he was active in crop production research and teaching. He has a keen interest in students working in an international setting and developing an international perspective on agriculture.

Stephen Gregg, a Ph.D. student in the APS program (advisor, Axel Garcia y Garcia), is the 2024 recipient of the fellowship.



Jason Hickman, Maicy Vossen, and CFANS Dean Brian Buhr

Little Red Oil Can Award

The Applied Plant Sciences Graduate Student Club received the CFANS Little Red Oil Can Award, which acknowledges those with special concern for others and interest in the general welfare of the community. By welcoming all students from various departments, APS Graduate Student Club fosters connections and communication among individuals who may not have otherwise interacted. Through regular social events, outreach activities, and volunteering efforts, the club strengthens bonds among students and contributes to a friendlier and more inclusive campus atmosphere.

Department award recipients Spring 2024

JAMES ANDERSON, CFANS Distinguished Teaching Award: Graduate Faculty, 2024

REX BERNARDO, Award for Outstanding Contributions to Graduate and Professional Education, 2024

MICHAEL BURNS, Doctoral Dissertation Fellowship, Graduate School, 2024

JEFF COULTER, Minnesota Future Farmers of America Honorary State Degree, 2024

LAUREN DOCHERTY, MnDRIVE Graduate Student Professional Development Award, 2024

MJAY ESPINA, UMN President's Student Leadership and Service Award, 2024

JO HEUSCHELE, Outreach, Diversity, and Equal Opportunity (Supervisory): for exemplary Mentoring of Young Scientists to Enhance Diversity of the ARS Workforce, 2024

CANDICE HIRSCH, McKnight Presidential Professorship in Plant Genomics and Excellence in Academic Unit Service, 2023

JACOB JUNGERS, McKnight Presidential Fellow, 2024-2027

JOAN BARRETO ORTIZ, MnDRIVE Global Food Ventures Graduate Student Professional Development Program, 2024

LOVEPREET SINGH, George Washington Carver Scholar, National Association of Plant Breeders, 2023

ROBERT STUPAR, Richard Bernard Mid-Career Award, 2023



Candice Hirsch, Gary Muehlbauer, and Jacob Jungers at the McKnight Award program in April.



Oilseeds, cover crops draw Delta and Hormel to campus

Photo by Jeff Thompson

By Katharine Chute

April was a busy month for the Forever Green Initiative, as the group hosted two major visits with leading companies and other key partners. On April 15, Forever Green welcomed Delta Air Lines and members of the GREATER MSP **Sustainable Aviation Fuel Hub** for a field tour and discussion of Forever Green's winter oilseed crops, winter camelina and pennycress. Then, on April 30, Forever Green hosted a large group workshop with Hormel Foods featuring a range of crops with potential for food or animal feed uses.

An essential part of Forever Green's theory of change is a concurrent focus on crop improvement and commercialization. Introducing a new, sustainable crop to the market is no small challenge, and it is exciting to see this level of engagement from industry leaders, who bring invaluable perspective on the roadmap ahead.

Delta Air Lines discusses oilseeds for jet fuel

On the path toward decarbonization, sustainable aviation fuel (SAF) has emerged as a key solution to reduce carbon emissions from air travel. Winter camelina and pennycress seeds can be crushed and turned into oil that is then refined into low carbon-intensity jet fuel. How this occurs and what it would take to scale this fuel pathway was the topic of discussion on April 15.

Delta Air Lines' chief sustainability officer Amelia DeLuca and Jeff Davidman, VP of state and local government affairs, were joined by representatives from GREATER MSP, Minnesota Environmental Partnership, Friends of the Mississippi River, Cargill, Bank of America, Ecolab, Xcel Energy, and Builders Initiative.

Continued on page 24

"This kind of innovative cross-sector engagement is what it takes to solve global problems and build new industries in our region, which we're doing right here, right now," said Peter Frosch, president and CEO of GREATER MSP Partnership, which leads the Minnesota SAF Hub.

According to Forever Green Associate Director Mitch Hunter, "If we develop an SAF market for winter camelina and pennycress, we can reduce greenhouse gas emissions from flying while also protecting soil, improving water quality, and providing economic opportunities for farmers and rural communities." This group of partners has the supply chain knowledge and expertise to contribute significantly to upscaling the production of these crops. "We are deeply appreciative of the time and perspective shared by Delta Air Lines and all who participated, and we look forward to continued engagement," Hunter said.

Hormel Foods takes a deep dive into CLC crops

UMN Forever Green had the opportunity to feature continuous living cover (CLC) crops and discuss their commercial potential with Hormel Foods on April 30. Forever Green hosted a group of 20 supply chain, research and development, culinary, and sustainability leaders from Hormel Foods for a field tour and workshop on regenerative grains. Crops featured included hybrid winter rye, hybrid hazelnuts, Kernza perennial grain, winter barley, winter field peas, elderberries, winter camelina, and pennycress. After an introduction to Forever Green's research platform, the group headed out on the St. Paul Campus for a field tour on an absolutely perfect spring day. The day continued with updates on the commercialization status of various crops, a delicious catered lunch from Eat Your Heart Out Catering featuring Forever

Continued on page 25



Left: Representatives from Delta Air Lines and partnering organizations during the April 15 tour. (Photo by Jeff Thompson) Right: Matt Leavitt, Forever Green agronomy specialist, explains the environmental benefits of hybrid winter rye. (Photo courtesy of Hormel Foods)

Green crop ingredients, a Q&A with chefs and food scientists, and research presentations about animal feed opportunities. The following day, the group visited a commercial-scale hybrid winter rye field near Hormel Foods headquarters. Throughout the program, it was energizing to hear the perspectives of Hormel Foods on the R&D and commercialization progress for these crops and how they might contribute to Hormel's 20 by 30 Global Impact goals. Forever Green is grateful to Hormel Foods for bringing together this group and looks forward to continued discussions.

Across both of these events, Forever Green sends out a huge thank you to the many UMN researchers who presented.

Katharine Chute is the product and market development specialist with the Forever Green Initiative.



Mitch Hunter, Forever Green Associate Director, introduces Forever Green's mission and vision. (Photo courtesy of Hormel Foods)



Hormel Foods and UMN Forever Green team members during their field tour of Forever Green research plots at the St. Paul Campus. (Photo courtesy of Hormel Foods)

Plant Pages

DEPARTMENT OF AGRONOMY AND PLANT GENETICS
411 BORLAUG HALL
1991 UPPER BUFORD CIRCLE
SAINT PAUL, MN 55108




GIVING

Your support makes a critical difference in what the Department of Agronomy and Plant Genetics is able to do together as a community: in the research we are able to advance, the new programs we are able to create, and the talented students we are able to support. Your spirit of giving is a tremendous vote of confidence in our shared endeavor. Support us:

Donate online: z.umn.edu/APG_GIVE



 @umn_agroplant

 @umn_agronomyandplantgenetics

 U of M Agronomy & Plant Genetics

